GEORGE AFB
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ADMINISTRATIVE RECORD
COVER SHEET

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Calvin Cox

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Sent: Thursday, May 3, 2018 4:31 PM
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Cc: 'Stone, Linda@Waterboards'; Battey, Todd@Waterboards; Indira Balkissoon
Subject: LF044 Cleanup Goals Language
Attachments: Table 2-3 FOSET#2 Action Sites ROD.docx; Table 2-4 Protection of GW CGs FOSET#2 ROD MCCL.docx

Importance: High

Hi Everyone,

As discussed during today's call, the EPA and the Waterboard have collaborated on an approach for addressing EPA's prior cleanup goal comments on LF044.

The response to EPA comments dated October 4, 2017 includes Table D-1 - Cleanup Goals. This table includes soil background data, the EPA RSL, DTSC HERO HHRA Note No 3 Guidance, LANL Ecological Benchmark, EPA Ecological Benchmark and San Francisco Bay RWQCB screening levels. Since this landfill site is being evaluated for unrestricted use/unrestricted exposure (UU/UE) and clean closure under California Code of Regulations (CCR) title 27, this table should also include surface water protection levels for the surface soil samples, 0 to 1 foot below ground surface (bgs). Subsurface soil sample, 1 to 15 feet bgs or bottom of waste should consider groundwater protection soil screen levels (SSLs). The McClellan Action Sites ROD Table 2-3 and Table 2-4 are attached an example of this approach. Please update Table D-1 to include the surface water and groundwater protections levels in developing LF044 clean up goals.

Also, please note that the Upper Confidence Level (UCL) approach described in the RODA is acceptable for risk assessment purposes, but not for protection of water quality. Therefore, the UCL approach can be applied to the human and ecological risk-based levels, but cannot be applied to the SSL, i.e., all soil that exceeds the SSL must be removed. Since most RSLs are lower than SSLs and since the Air Force does not anticipate contaminated soils , attainment of soil concentrations below SSLs should not significantly impact the level of effort to achieve UU/UE and clean closure under CCR title 27.

Please let us know if you have any questions or concerns. I'm happy to set up a meeting to discuss if needed.

Thank you.

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Table 2-3 Cleanup Levels – FOSET # 2 Action Sites

COC	Unrestricted Use Cleanup Levels (mg/kg)				Industrial Use Cleanup Levels (mg/kg)			
	0–1 foot bgs	Basis for Cleanup	1–15 feet bgs	Basis for Cleanup	0–1 foot bgs	Basis for Cleanup	1–15 feet bgs	Basis for Cleanup
Inorganics								
Antimony	20	Protection of human health	20	Protection of human health	190	Protection of surface water	370	Protection of human health
Arsenic	12	Protection of human health	12	Protection of human health	12	Protection of human health	12	Protection of human health
Cadmium	4.1	Surface soil background	6.2	Protection of human health	4.1	Surface soil background	96	Protection of groundwater
Cobalt	16	Surface soil background	18	Subsurface soil background	270	Protection of human health	270	Protection of human health
Copper	130	Protection of surface water	1,400	Protection of human health	130	Protection of surface water	37,000	Protection of human health
Lead	140	Surface soil background	80	Protection of human health	140	Surface soil background	320	Protection of human health
Manganese	830	Protection of human health	830	Protection of human health	1,600	Protection of surface water	22,000	Protection of human health
Mercury	1.6	Protection of surface water	3.5	Protection of human health	1.6	Protection of surface water	120	Protection of groundwater
Zinc	1,700	Protection of surface water	3,100	Protection of human health	1,700	Protection of surface water	140,000	Protection of groundwater
SVOCs								
1-Methylnaphthalene	0.73	Protection of human health	0.73	Protection of human health	89	Protection of human health	89	Protection of human health
2-Methylnaphthalene	16	Protection of human health	16	Protection of human health	170	Protection of human health	170	Protection of human health
1,2-Dichlorobenzene	190	Protection of human health	190	Protection of human health	770	Protection of surface water	3,900	Protection of human health, groundwater
1,3-Dichlorobenzene	76	Protection of human health	76	Protection of human health	1,900	Protection of human health	1,900	Protection of human health, groundwater
1,4-Dichlorobenzene	1.1	Protection of human health	1.1	Protection of human health	4.5	Protection of human health	4.5	Protection of human health
4-Chloroaniline	1.3	Protection of human health	1.3	Protection of human health	900	Protection of surface water	1,900	Protection of human health, groundwater
Benzo(a)anthracene	0.088	Protection of human health	0.088	Protection of human health	0.14	Protection of surface water	0.88	Protection of human health
Benzo(a)pyrene	0.018	Protection of human health	0.018	Protection of human health	0.14	Protection of surface water	0.14	Protection of human health
Benzo(b)fluoranthene	0.11	Protection of human health	0.11	Protection of human health	0.14	Protection of surface water	0.88	Protection of human health

COC	Unrestricted Use Cleanup Levels (mg/kg)				Industrial Use Cleanup Levels (mg/kg)			
	0–1 foot bgs	Basis for Cleanup	1–15 feet bgs	Basis for Cleanup	0–1 foot bgs	Basis for Cleanup	1–15 feet bgs	Basis for Cleanup
Benzo(k)fluoranthene	0.11	Protection of human health	0.11	Protection of human health	0.14	Protection of surface water	0.88	Protection of human health
Chlordane (alpha, gamma)	0.018	Protection of surface water	0.43	Protection of human health	0.018	Protection of surface water	5.2	Protection of human health, groundwater
Chrysene	0.14	Protection of surface water	0.88	Protection of human health	0.14	Protection of surface water	8.7	Protection of human health
Dibenzo(a,h)anthracene	0.038	Protection of human health	0.038	Protection of human health	0.14	Protection of surface water	0.26	Protection of human health
DDD	0.027	Protection of surface water	0.50	Protection of human health	0.027	Protection of surface water	7.6	Protection of human health, groundwater
DDE	0.019	Protection of surface water	0.49	Protection of human health	0.019	Protection of surface water	5.4	Protection of human health, groundwater
DDT	0.019	Protection of surface water	0.47	Protection of human health	0.019	Protection of surface water	5.4	Protection of human health, groundwater
Dieldrin	0.0045	Protection of surface water	0.0058	Protection of human health	0.0045	Protection of surface water	0.11	Protection of human health
Dioxins/Furans	4.2E-07	Protection of surface water	1.3E-06	Protection of human health	4.2E-07	Protection of surface water	1.6E-05	Protection of human health
Indeno(1,2,3-c,d)pyrene	0.12	Protection of human health	0.12	Protection of human health	0.14	Protection of surface water	0.88	Protection of human health
Naphthalene	2.4	Protection of human health	2.4	Protection of human health	5.1	Protection of human health	5.1	Protection of human health
PCBs (Aroclor-1254 and Aroclor-1260)	0.063	Protection of human health	0.063	Protection of human health	0.063	Protection of human health	0.53	Protection of human health
Total Petroleum Hydrocarbons	**0–1 foot bgs**	**Basis for Cleanup**	**1–30 feet bgs**	**Basis for Cleanup**	**0–1 foot bgs**	**Basis for Cleanup**	**1–30 feet bgs**	**Basis for Cleanup**
TPH-D	3,200	Protection of surface water	3,900	Protection of groundwater	3,200	Protection of surface water	3,900	Protection of groundwater
TPH-G	160	Protection of surface water	220	Protection of groundwater	160	Protection of surface water	220	Protection of groundwater

Notes: Values for protection of human health, used as the basis for cleanup for non-VOCs and VOCs, are equivalent to the lesser of the carcinogenic risk of 1E-06 or a Hazard Quotient (HQ) 1 for each contaminant for exposure to soil through direct contact, inhalation, and ingestion for the industrial use scenario.

COC contaminant of concern
bgs below ground surface
DDD Dichlorodiphenyldichloroethane
DDE Dichlorodiphenyldichloroethylene
DDT Dichlorodiphenyltrichloroethane
mg/kg milligrams per kilogram
PCBs polychlorinated biphenyls
SVOC semi-volatile organic compound
TPH-D Total petroleum hydrocarbons as diesel
TPH-G Total petroleum hydrocarbons as gasoline

Table 2-4 Levels for Protection of Surface Water and Groundwater Quality

	Protection of Surface Water Levels	Protection of Groundwater Levels
Contaminant[b]	**0 to 1 foot bgs**	**0 to 30 feet bgs**
Inorganics (mg/kg)		
Aluminum	15,000[d]	84,000
Antimony[c]	190	600
Arsenic[f]	12[d]	12[d]
Cadmium	4.1[d]	96
Cobalt	1,600	47,000
Copper	130	250,000
Cyanide	170	--
Lead	140[d]	4,300
Manganese[c]	1,600	28,000
Mercury	1.6	120
Zinc	1,700	140,000
SVOCs (mg/kg)		
1,2-Dichlorobenzene[c]	770	3,900
1,3-Dichlorobenzene[c]	13,000	1,900
1,4-Dichlorobenzene	160	14
1-Methylnaphthalene	--	89
2-Methylnaphthalene[c]	--	170
2,3,7,8-TCDD (dioxins/furans, total TEQ)	0.00000042	0.0027
4-Chloroaniline[c]	900	--
Benzo(a)anthracene	0.14	17
Benzo(a)pyrene	0.14	17
Benzo(b)fluoranthene	0.14	22
Benzo(k)fluoranthene	0.14	9.8
Chlordane, alpha[c]	0.018	5.2
Chlordane, gamma[c]	0.018	5.2
Chrysene	0.14	18
DDD[c]	0.027	7.6
DDE[c]	0.019	5.4
DDT[c]	0.019	5.4
Dibenzo(a,h)anthracene	0.14	8.3
Dieldrin	0.0045	0.11
Indeno(1,2,3-cd)pyrene	0.14	11
Naphthalene	670	1,100
PCBs (Aroclor-1254, Aroclor-1260)[e]	0.17	540
TPH (mg/kg)		
TPH-D	3,200	3,900
TPH-G	160	220

Table 2-4 Levels for Protection of Surface Water and Groundwater Quality

Notes: **a)** The values contained in this table are for use in determining whether ICs and/or ECs are necessary for the protection of groundwater and surface water quality.
b) The source of the lev ls for protection of groundwater and surface water is Table 80 of the FOSS ROD, unless otherwise noted.

c) The source of the levels for protection of groundwater and surface water is Table C1-19 of the FOSS RICS because the contaminant was not included in Table 80 of the FOSS ROD.
d) The background value is higher than the levels for protection of groundwater and surface water, so the background value has been included in place of the values specified in Table 80 of the FOSS ROD or Table C1-19 of the FOSS RICS.
e) The screening level for protection of surface water for total PCBs is based on 25% of the high TRV for benthic invertebrates.
f) The cleanup levels for arsenic are based on the recently revised background threshold value and risk management action level for arsenic (95% UTL with 99% coverage).

-- no protection level was developed bgs
below ground surface
DDD dichlorodiphenyldichloroethane
DDE dichlorodiphenyldichloroethylene
DDT dichlorodiphenyltrichloroethane
EC engineered control
FOSS Follow-on Strategic Sites IC
institutional control mg/kg
milligrams per kilogram PCBs
polychlorinated biphenyls
RICS Remedial Investigation Characterization Summary
ROD Record of Decision
SVOCs semi-volatile organic
compounds TCDD tetrachlorodibenzo-
p-dioxin TPH total petroleum
hydrocarbons
TPH-D total petroleum hydrocarbons as diesel
TPH-G total petroleum hydrocarbons as diesel
TRV toxicity reference value
UTL e level

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